# Mysteries of Massive, Young, Star-Forming Galaxies Explained

***Objective***: **Explain galaxy formation and evolution via high-resolution gas hydrodynamic simulations.**

***Implications***: **Help solve some remaining mysteries of the standard model of big bang cosmology.**

***Accomplishments***: **Results help explain the formation of huge star-forming galaxies that date from the early universe.**

- **Best physics, highest resolution simulations of galaxy formation to date.**
- **Identified role of small-scale supernovae explosions and stellar wind feedback**
    - **Showed where and how energy from massive stars is released**

- ***NERSC***: **Used mostly single-node Bassi, some Franklin (248 cores)**

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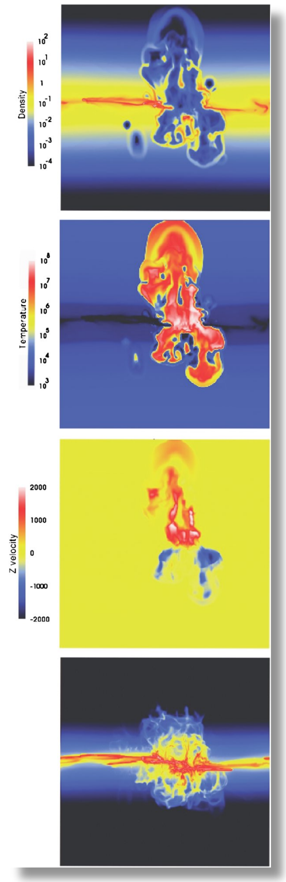


*Simulations showing the formation of a galactic "chimney" that happens when the energy input of stellar superclusters causes gases to shoot upwards at speeds up to 1000 km per second at temperatures reaching 100 million Kelvin. These edge-on slices through the simulation show density, temperature, and velocity. Small bubbles of hot gas in the field (visible in the top two frames) are the result of stellar feedback from runaway stars. The elucidation of the feedback mechanism, a result of the resolution and physics models employed, is one of the key results of this work.*

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